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**A SECOND COLLECTION OF FISHES FROM THE PANAMA CANAL ZONE.**

BY HENRY W. FOWLER.

Mr. David E. Harrower again visited the Canal zone in the summer of 1916, and made a collection of marine fishes at Colon. These have been purchased by the Academy. Two species appear to be new and several others are interesting records.

***Sphyrna tiburo*** (Linné).

Three heads, 128 to 162 mm. wide. Also seven young, 160 to 245 mm. long.

***Sphyrna zygaena*** (Linné).

Two heads preserved, 167 to 198 mm. wide.

***Eulamia commersonii*** (Blainville).

A head of a slightly larger example than any identified as *Eulamia porosus*, shows several characters not in agreement. The nostril as seen in profile begins nearly midway in the length of the snout and nasal valves with only very obtuse wide point at hind angles, whereas in *E. porosus* the point is distinct and projecting. Each mouth corner with a conspicuous though very short fold. Teeth all very finely serrate. No pores on lower internasal space as in *E. porosus*, those above rictus and in postorbital region inconspicuous, whereas in *E. porosus* the reverse obtains.

Miller and Henle state<sup>1</sup> "Maul schwach konvex." Their figure of the lower view of the head does not show any distinct point to the ends of the nasal lobes, and there is no indication of a fold at the mouth corner. It also shows the space between the snout tip and mouth about an eye-diameter greater than the space between the outer nasal corners, which is not in agreement with my specimen. The short labial groove at each mouth angle and the width of the orbit half of space to nostril are points in agreement with my material.

***Eulamia porosus*** (Ranzani).

One example, 432 mm. long, and three heads. The first smallest, and shows the nostrils in the last third of the snout, though in the largest head only slightly more forward. The smallest shows the mouth length  $\frac{2}{3}$  its width, while in the largest but little over half its

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<sup>1</sup> Besch. Plagiost., 1839, p. 37, Pl. 12.

width. In the smallest example space between front tip of lower jaw and snout tip slightly less than snout measured from its tip to eye. All have a distinct projecting point to the nasal valve. Very slight outer fold at mouth corner.

Ranzani's lateral figure<sup>2</sup> shows the nostril near the last fourth of the snout as seen in profile. His lower view of the head shows it slightly behind middle in snout length, as measured from snout tip to eye. Also the mouth length is shown greater than its width and without any trace of a short groove at the outer corners. His specimen was about 1,171 mm. long.

**Scoliodon lalandi** (Müller and Henle).

One example, 425 mm. long. Width of snout at outer nostril edges shorter than space between snout tip and front tip of lower jaw by nearly length of nasal aperture. Nostrils about last  $\frac{2}{3}$  in snout length.

Compared with *Scoliodon terræ-novæ* from Holly Beach, New Jersey, the width of snout, as measured above, of nearly equal length with space between snout tip and front tip of lower jaw. This species also shows the nostril about last  $\frac{2}{3}$  in snout.

**Albula vulpes** (Linné).

Eight examples, largest 324 mm. long.

**Sardinella humeralis** (Valenciennes).

Nine, largest 152 mm.

**Opisthonema oglinum** (Le Sueur).

Three, 105 to 162 mm.

**Ilisha harroweri** sp. nov. Fig. 1.

Head  $3\frac{1}{8}$ ; depth  $2\frac{2}{3}$ ; D. III, 13; A. IV, 36, I; P. II, 12; V. I, 5; scales about 34? (according to pockets) in lateral series to caudal base; about 14? scales (squamation injured) between dorsal and anal origins; head width  $2\frac{2}{3}$  its length; head depth  $1\frac{1}{7}$ ; dorsal base  $2\frac{1}{4}$ ; mandible 2; least depth of caudal peduncle  $3\frac{1}{8}$ ; lower caudal lobe  $1\frac{1}{6}$ ; pectoral  $1\frac{2}{3}$ ; first branched anal ray  $2\frac{4}{5}$ ; snout 4 in head measured from upper jaw tip; eye  $2\frac{3}{4}$ ; maxillary  $1\frac{7}{8}$ ; interorbital  $5\frac{1}{8}$ .

Body strongly compressed, thin, deepest at ventral origin, edges slightly trenchant, abdominal edge with 20+6 serræ forming trenchant keel, profiles similarly convex. Caudal peduncle compressed, length about equals its least depth.

Head compressed, sides moderately flattened, strongly convergent below, upper profile moderately inclined and lower more so. Snout

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<sup>2</sup> Nov. Com. Ac. S. I. Benon., IV, 1840, p. 71, Pl. 9.

surface convex, wide as long. Eye large, rounded, nearly midway in head. No adipose eyelid. Maxillary greatly inclined, reaches slightly beyond front pupil edge till about opposite first  $\frac{2}{3}$  in eye, its lower edge minutely dentate and greatest expansion about  $\frac{1}{2}$  of eye. Mouth rather small, superior. Upper jaw with slight median emargination as viewed from above. Mandible well protruded, rami well elevated inside mouth. Each premaxillary with a row of fine, slender, small teeth, median largest, others graduated smaller forward and backward. Few weak mandibular teeth. Each palatine with lengthwise patch of minute teeth. Tongue narrow, depressed, few asperities above posteriorly, free in front and end rounded. Nostrils together, hind one slit-like, about midway in

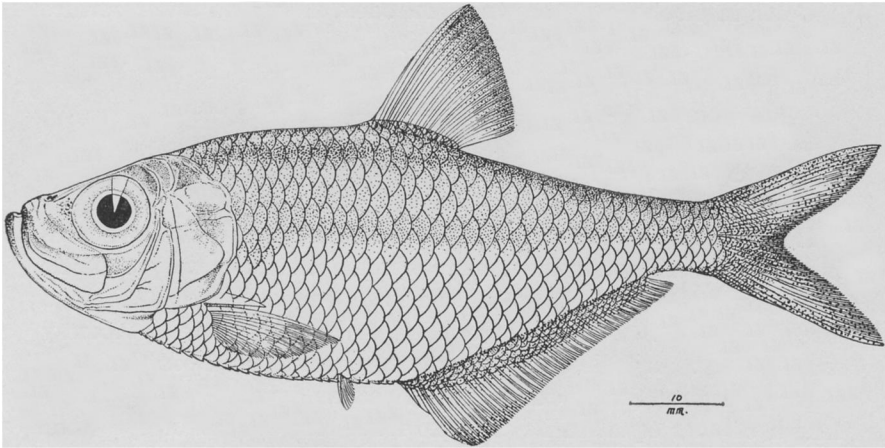


Fig. 1.—*Ilisha harroweri* sp. nov.

snout. Interorbital constricted, but slightly elevated, depressed or with rather deep concave depression extending backward. Pre-orbital width slightly less than  $\frac{2}{3}$  of eye, slips over greater portion of upper maxillary edge. Postero-infraorbital about  $\frac{2}{3}$  of pupil. Pre-opercle ridge oblique and hind edge only slightly inclined forward. Opercles and cheeks smooth, latter with few traces of obsolete striæ.

Gill-opening forward about opposite front eye edge. Rakers  $12 + 24$ , lanceolate, about 3 in eye. Filaments about  $\frac{2}{3}$  of rakers. Pseudobranchiæ  $2\frac{1}{2}$  in eye, much larger than filaments. Isthmus slender, compressed, little swollen behind. Shoulder-girdle without depression, though flexible fleshy keel before pectoral base.

Scales large, cycloid, with 3 to 5 vertical striæ on each, edges entire, arranged in lengthwise series, largest along middle of side

and very caducous. Caudal and anal bases largely scaly, though scales now largely fallen. Pectoral with free, pointed axillary scale slightly less than half length of fin. Ventral with small, pointed axillary scale.

Dorsal inserted slightly nearer caudal base than lower jaw tip, graduated down from first branched ray which longest (now damaged), depressed fin  $2\frac{2}{3}$  to caudal base. Anal inserted about opposite first third of dorsal base, first branched ray longest, and base of fin straight. Caudal forked, pointed lobes about equal. Pectoral rather broad, reaches back but slightly beyond ventral base. Ventral about long as pupil, inserted slightly before dorsal origin, and reaches half way to anal. Vent close before anal.

Color in alcohol pale brownish on back, sides and lower surface whitish, evidently bright silvery-white in life. Same also of head. Lips tinted with brownish. Iris whitish. Fins all pale brownish, dorsal and caudal tinged slightly with dusky about borders.

Length, 96 mm.

Type No. 46,959, A. N. S. P. One example from Colon. 1916. D. E. Harrower.

Related to *Pellona castelnæana* Valenciennes,<sup>3</sup> which differs according to the description in the numerous ramified striæ in the preopercle and opercle, D. 19, A. 36 to 38, and lower caudal lobe marked by a large black spot. *Pellona bleekariana* Poey<sup>4</sup> is also related, evidently more closely. It is described, however, with the eye  $3\frac{1}{2}$  in the head, depth  $5\frac{2}{3}$  in total (in my example  $3\frac{2}{3}$ ), A. 43, anal placed behind dorsal, length of anal equal to its distance from hind border of eye (anal length shorter in my example), and maxillary to hind pupil edge. As Poey's example was 104 mm. long, it hardly appears likely these differences are due to age.

(Named for Mr. David E. Harrower, who collected the type.)

**Anchovia macrolepidota** (Kner and Steindachner).

Three examples, 197 to 202 mm. long.

**Ophichthus gomesii** (Castelnau).

Head 3 to vent; head and trunk  $2\frac{1}{10}$  in tail; snout 6 in head; mouth  $2\frac{2}{3}$ ; pectoral  $2\frac{2}{3}$ ; eye  $1\frac{3}{4}$  in snout and  $1\frac{2}{5}$  in interorbital. Teeth biserial in lower jaw and on vomer. Nasal tubes short, pointed. Gill-opening long as snout. Pores on muzzle and head conspicuous. Dorsal inserted just behind end of depressed pectoral. Color in

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<sup>3</sup> Hist. Nat. Poiss., XX, 1844, p. 222. Mouth of the Amazon.

<sup>4</sup> Repertor. H. N. Cuba, II, 1867, p. 242. Matanzas.

alcohol largely uniform olive-brown above, pale yellowish below (later turning whitish). Lower jaw grayish. Dorsal and anal pale or translucent, edged blackish, this most distinct posteriorly. End of tail whitish. Pectoral grayish. Iris white. Length, 400 mm.

**Gymnothorax funebris** Ranzani.

Head of large example. It shows eye 2 in snout, mouth completely closing and vomer with two rows of teeth in its median extent.

**Gymnothorax ocellatus** Agassiz.

Four examples, 350 to 395 mm.

**Felichthys marinus** (Mitchill).

Three examples, 315 to 324 mm. long, which agree with my New Jersey series. The specimen recently listed<sup>5</sup> from Wounta Haulover, Nicaragua, is found on further comparison to be *Felichthys filamentosus* Swainson, differing chiefly in its longer pectoral spine, which is very little shorter than the head.

**Tylosurus timucū** (Walbaum).

Two examples, 483 to 490 mm.

**Sphyræna guachancho** Cuvier.

Five, 180 to 228 mm.

**Holocentrus adscensionis** (Osbeck).

Three, 146 to 180 mm.

**Scomberomorus cavalla** (Cuvier).

Three examples, 191 to 228 mm. All with isopod parasites in the gill-cavities.

I previously listed young examples from Port Limon, Costa Rica<sup>6</sup> and Colon.<sup>7</sup> A re-examination and comparison of this material shows that three larger examples of those obtained at Colon are *Scomberomorus maculatus* (length 127 to 148 mm.) The one representing the present species is 147 mm. long.

**Caranx bartholomæi** Valenciennes.

One, 173 mm. long.

**Caranx hippos** (Linné).

Three, 127 to 142 mm.

**Caranx crysos** (Mitchill).

Two, 140 and 148 mm.

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<sup>5</sup> PROC. ACAD. NAT. SCI. PHILA., 1915, p. 203.

<sup>6</sup> PROC. ACAD. NAT. SCI. PHILA., 1916, p. 398.

<sup>7</sup> *L.c.*, p. 401.

**Caranx latus** Agassiz.

Two examples, 122 and 136 mm. Scutes 40.

**Vomer setapinnis** (Mitchill).

Six, 98 to 170 mm.

**Chloroscombrus chrysurus** (Linné).

Five, 68 to 186 mm.

**Trachinotus glaucus** (Bloch).

Two, 132 and 148 mm.

**Trachinotus falcatus** (Linné),

One, 117 mm.

**Epinephelus mystacinus** (Poey).

One, 148 mm.

**Epinephelus striatus** (Bloch).

One, 150 mm.

**Lutianus analis** (Cuvier).

Four, 137 to 154 mm.

**Lutianus synagris** (Linné).

Six, 103 to 142 mm.

**Ocyurus chrysurus** (Bloch).

One, 177 mm.

**Rhomboplites aurorubens** (Cuvier).

Five, 128 to 155 mm.

**Hæmulon parra** (Desmarest).

Four, 137 to 153 mm.

**Hæmulon flavolineatum** (Desmarest).

Three, 118 to 126 mm.

**Anisotremus virginicus** (Linné).

Four, 110 to 144 mm.

**Conodon nobilis** (Linné).

Two, 110 and 135 mm.

**Brachydeuterus corvinæformis** (Steindachner).

Seven, 88 to 123 mm.

**Archosargus unimaculatus** (Bloch).

Five, 117 to 130 mm.

**Cynoscion acoupa** (Lacépède).

One, 188 mm.

**Larimus breviceps** Cuvier.

Four, 117 to 162 mm.

**Bairdiella ronchus** (Cuvier).

Three, 132 to 152 mm.

**Umbrina coroides** (Valenciennes).

Three, 110 to 154 mm.

**Eucinostomus pseudogula** Poey.

Four examples, 93 to 137 mm. *Eucinostomus harengulus* Goode and Bean, as previously reported from Port Limon, Costa Rica,<sup>8</sup> and Colon,<sup>9</sup> in the slightly more slender body (depth  $2\frac{1}{3}$  to 3) and slightly longer second anal spine. The present examples show the depth  $2\frac{4}{5}$  to  $2\frac{7}{8}$ .

**Eucinostomus gula** (Valenciennes).

Eight, 88 to 117 mm. Depth  $3\frac{1}{3}$ .

**Gerres rhombeus** Cuvier.

Eight, 95 to 135 mm.

**Upeneus maculatus** (Bloch).

Five, 118 to 180 mm.

**Polydactylus virginicus** (Linné).

Four, 98 to 226 mm.

**Abudefduf mauritii** (Bloch).

Six, 78 to 98 mm.

**Lachnolaimus maximus** (Walbaum).

One, 128 mm.

**Gallyodon margarita** sp. nov. Fig. 2.

Head 3; depth  $3\frac{1}{3}$ ; D. IX, 10; A. II, 10; P. I, 12; V. I, 5; scales 23 in l. l. to caudal base, and 2 more on latter; 2 scales above l. l. to spinous dorsal origin; 7 scales below l. l. to spinous anal origin; 6 median predorsal scales; 5 median scales on breast before ventral origins; head width  $1\frac{1}{4}$  in its length; head depth at occiput,  $1\frac{1}{3}$ ; snout about 3 in head; eye  $5\frac{1}{2}$ ; maxillary  $4\frac{4}{5}$ ; interorbital 3; first dorsal spine  $2\frac{2}{5}$ ; first dorsal ray  $2\frac{1}{2}$ ; first anal ray 4; least depth of caudal peduncle  $2\frac{1}{2}$ ; pectoral  $1\frac{4}{5}$ ; ventral  $1\frac{7}{8}$ .

Body elongate, moderately compressed, deepest about opposite middle of pectoral, edges all rounded convexly. Caudal peduncle compressed, about long as deep.

Head compressed, moderately deep, profiles little convex and alike, sides flattened. Snout convex over surface, slightly so in profile, and length about  $\frac{4}{5}$  its width. Eye rounded, rather high,

<sup>8</sup> PROC. ACAD. NAT. SCI. PHILA., 1916, p. 399.

<sup>9</sup> *L.c.*, p. 404.



and hind edge anterior to midway in head length. Mouth terminal, commissure not quite extending half way to eye and inclined slightly down in front. Maxillary largely concealed. Lips thin, scarcely free. Teeth with nearly even cutting-edges, especially lower, and all form narrow trenchant margins. Upper dental area with slight notch near middle of each side, and behind this four small, erect external canines each side. No lower canines. Both inner buccal folds broad. Tongue large, thick, fleshy, not free. Nostrils pore-like, level with upper part of eye, anterior about last third in snout length. Interorbital slightly convex. Preopercle ridge little distinct, with number of short radiating tubes.

Gill-opening extends forward about opposite middle of eye. Gill-

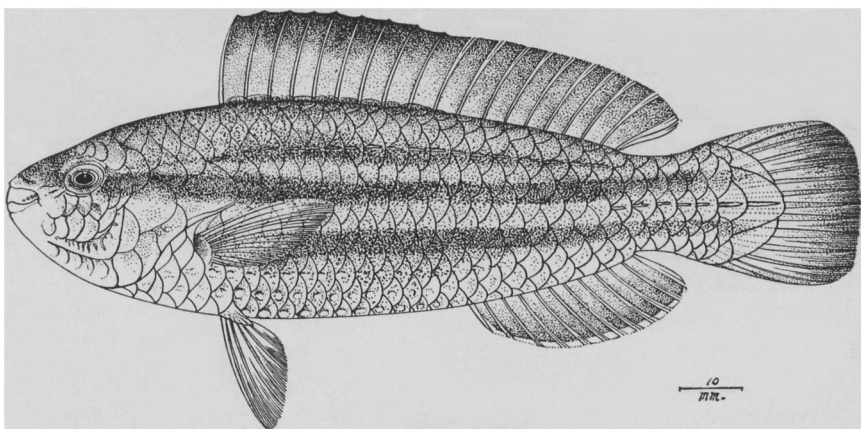


Fig. 2.—*Callyodon margarita* sp. nov.

rakers 12+19, slender, fine, flexible, about 3 in filaments, and latter about equal eye. Pseudobranchiæ little smaller than filaments. Branchiostegals moderate. Isthmus convex.

Scales large, cycloid, in even lengthwise series, more or less equal in size, though largest on middle of sides and breast. Ventral with free, pointed axillary scale about  $\frac{1}{3}$  length of fin. Fins naked, except large scales covering caudal base. Largely two rows of scales on cheek. L. 1. complete, high, mostly concurrent with dorsal profile, and falls midway along side of caudal peduncle. Scales in l. 1. slightly smaller than those adjoining. Tubes largely simple, or with only very short branch basally.

Dorsal origin slightly before first third in space between snout tip and caudal base, spines largely pungent though tips somewhat flexible, and edge of fin entire. Anal spines small, somewhat flexible,

fin otherwise like dorsal. Caudal with hind edge rounded. Pectoral small, first rudimentary ray short and as concealed thorn, fin extending  $1\frac{7}{8}$  to anal. Ventral inserted slightly behind pectoral origin, fin reaching half way to vent.

Color in alcohol largely dull brownish, lower sides and under surfaces paler to whitish. Upper surface of head with slaty tints. Teeth whitish. Iris pale yellowish. An obscure dark brownish lengthwise band from eye to upper caudal base. Below a similar shorter band, parallel, from pectoral axil back to lower caudal base. Vertical fins all pale dusky, lower anal edge whitish. Outer pectoral base dusky above, fin pale. Ventral whitish. Scales below lower dark lateral band on each side of median ventral row, each with white median spot, and those of lowermost row largest.

Length, 138 mm.

Type, 46,960, A. N. S. P. Colon, Panama Canal Zone. 1916. David E. Harrower.

Only the above known, and evidently allied with *Callyodon trispinosus* (Valenciennes), but that species has been described as uniform reddish-brown. Another allied species is *Callyodon aracanga* (Günther) which is uniform dark violet-purple and with the median fins very dark. The present species differs from these, as well as the others in the genus by its dark lengthwise bands and pearly-white abdominal spots.

(*Margarita*, a pearl, with reference to the white spots on the abdomen.)

**Chætodipterus faber** (Broussonet).

Four, 95 to 135 mm.

**Chætodon ocellatus** Bloch.

One, 98 mm.

**Chætodon capistratus** Linné.

Two, 75 and 80 mm.

**Angelichthys ciliaris** (Linné).

One, 145 mm.

**Hepatus hepatus** (Linné).

Two, 105 and 128 mm.

**Hepatus bahianus** (Castelnau).

One, 132 mm.

**Alutera punctata** Agassiz.

One, 195 mm.

**Lactophrys trigonus** (Linné).

Four, 100 to 255 mm.

**Lactophrys tricornis** (Linné).

One, 205 mm.

**Lagocephalus pachycephalus** (Ranzani).

One, 285 mm.

**Spheroides testudineus** (Linné).

Four, 130 to 175 mm.

**Chilomycterus antennatus** (Cuvier).

Three, 100 to 160 mm.

**Dactylopterus volitans** (Linné).

One, 180 mm.

**Batrachoides surinamensis** (Schneider).

One, 300 mm.

**Citharichthys arenaceus** Everman and Marsh.

Three, 80 to 103 mm.

**Achirus lineatus** (Linné).

Three, 122 to 180 mm. On pale side caudal peduncle and adjacent region of trunk dusky.

**Symphurus plagusia** (Schneider).

One, 118 mm.